

**Table A-10**

**Soil Analytical Results for Metals and Petroleum Hydrocarbons, mg/kg  
Core Drilling Sampling, May - September 2001**

**Weyerhaeuser-Dupont Interim Source Removal Action**

**Dupont, Washington**

**URS Project # 53-02000093.01**

Sample ID	Wey-Geo-1	Wey-Geo-2	Wey-Geo-3	Wey-Geo-4	Wey-Geo-5
Sample Date	6/21/01	6/21/01	6/21/01	6/21/01	6/21/01
Arsenic	13	NA	NA	NA	NA
Aluminum	530	NA	NA	NA	NA
Antimony	9.3 U	NA	NA	NA	NA
Barium	5	NA	NA	NA	NA
Beryllium	0.37 U	NA	NA	NA	NA
Cadmium	0.93 U	NA	NA	NA	NA
Calcium	190 U	NA	NA	NA	NA
Chromium	2	NA	NA	NA	NA
Cobalt	0.93 U	NA	NA	NA	NA
Copper	8.3	NA	NA	NA	NA
Iron	2600	NA	NA	NA	NA
Lead	5.1	NA	NA	NA	NA
Magnesium	190 U	NA	NA	NA	NA
Manganese	4	NA	NA	NA	NA
Mercury	0.019 U	NA	NA	NA	NA
Nickel	1.9 U	NA	NA	NA	NA
Potassium	370 U	NA	NA	NA	NA
Selenium	9.3 U	NA	NA	NA	NA
Silver	1.9 U	NA	NA	NA	NA
Sodium	190 U	NA	NA	NA	NA
Thallium	3.7 U	NA	NA	NA	NA
Vanadium	1.2	NA	NA	NA	NA
Zinc	1.9 U	NA	NA	NA	NA
#2 Diesel	NA	32 U	28 U	18 J	31 U
Motor Oil	NA	64 U	57 U	61 U	61 U

U The analyte was analyzed for, but was not detected above the reporting limit shown.

J Estimated Value, qualifier assigned during data review

NA Not Analyzed

**Table A-11**  
**Soil Analytical Results for Lead and Arsenic**  
**Topsoil Laydown Areas Sampling, May - September 2001**  
**Weyerhaeuser-Dupont Interim Source Removal Action**  
**Dupont, Washington**  
**URS Project # 53-02000093.01**

Sample ID	Date Sampled	Arsenic (mg/kg)		Lead (mg/kg)		Duplicate Sample ID
01-TS03-SS-[R23C09]-D1-015	4-Sep-01	7		17		
01-TS03-SS-[R24C09]-D1-015	4-Sep-01	10		9.2		
01-TS03-SS-[R24C08]-D1-015	4-Sep-01	5.8		8.8		
01-TS03-SS-[R25C08]-D1-015	4-Sep-01	9.5		21		
01-TS03-SS-[R25C09]-D1-015	4-Sep-01	8.9		96		
01-TS03-SS-[R24C10]-D1-015	4-Sep-01	10		28		
01-TS03-SS-[R25C10]-D1-015	4-Sep-01	4.8		12		
01-TS04-SS[R35C16]-D1-015	4-Sep-01	8.1		15		
01-TS04-SS[R34C15]-D1-015	4-Sep-01	31		120		
01-TS04-SS[R35C14]-D1-015	4-Sep-01	33		19		
01-TS04-SS[R36C16]-D1-015	4-Sep-01	19		31		
01-TS04-SS[R35C15]-D1-015	4-Sep-01	10		9.5		
01-TS04-SS[R37C17]-D1-015	4-Sep-01	16		22		
02-TS04-SS-[R34C15-2]-D2-030	19-Sep-01	8.2		5.8		

**Table A-12**

**Soil Analytical Results for Lead and Arsenic**

**Production Well Sampling, May - September 2001**

**Weyerhaeuser-Dupont Interim Source Removal Action**

**Dupont, Washington**

**URS Project # 53-02000093.01**

Sample ID	Date Sampled	Arsenic (mg/kg)		Lead (mg/kg)		Duplicate Sample ID
01-C-SS[PW-1]C2-005	11-Jul-01	6.4		8.6		

**Table A-13**

**Soil Analytical Results for Explosives**

**Hoffman Reservoir Sampling, May - September 2001**

**Weyerhaeuser-Dupont Interim Source Removal Action**

**Dupont, Washington**

**URS Project # 53-02000093.01**

<b>Sample ID</b>	<b>Date Sampled</b>	<b>2,4,6-Trinitrotoluene (mg/kg)</b>	<b>2,4-Dinitrotoluene (mg/kg)</b>	<b>2,6-Dinitrotoluene (mg/kg)</b>	<b>Field Duplicate Sample ID</b>
HOFRES	7-May-01	0.05 U	0.05 U	0.05 U	

U - The analyte was analyzed for, but was not detected above the reporting limit shown.

## Laboratory Analytical Data Validation Results

### 1 Summary

The soil sample analytical data reviewed from the Stockpile Interim Action Program are acceptable for use based on a majority of acceptable quality control data. The data meet criteria specified in the 1992 Hart Crowser Management Plan.<sup>1</sup> The data may be used to assess analyte concentrations with the stated qualifications.

### 2 Introduction

This section presents a quality control (QC) review of data generated from collection and analysis of soil stockpile samples from the former DuPont Works Site in Dupont, Washington, from March 19, 2001 through May 7, 2001. Samples were submitted to Sound Analytical Services, Inc. (SAS) located in Tacoma, Washington for analysis. This review includes evaluation of the following:

- Laboratory report and reporting of required analyses
- Chain of custody and holding times
- Method blanks
- Surrogate recoveries
- Matrix spike / blank spike (MS / BS)
- Laboratory duplicates
- Field duplicates
- Reporting limits

The data quality review was conducted using guidance from the following documents:

- Remedial Investigation/Feasibility Study, Former Dupont Works Site Management Plan, Hart Crowser, January 1992. (Management Plan)
- Work Plan, Interim Source Removal Actions: On-site Stockpiles, Pioneer Technologies Corporation, West Shore Corporation, NW, March 9, 2001.
- National Functional Guidelines for Inorganic Data Review, EPA, February 1994.
- National Functional Guidelines for Organic Data Review, EPA, February 1994.

Criteria used to assess the data are found in Section 5 of the Management Plan. The analytical data have been compared to criteria referenced in the Management Plan. The samples were analyzed for one or more of the following chemicals by the analytical methods shown.

- |   |          |
|---|----------|
| • Metals (Arsenic and Lead)   | EPA 6010 |
| • Explosives (2,4-Dinitrotoluene, 2,6-Dinitrotoluene and 2,4,6-Trinitrotoluene) | EPA 8330 |
| • Diesel range and motor oil range total petroleum hydrocarbons                 | NWTPH-Dx |

<sup>1</sup> Hart Crowser. January 17, 1992. Management Plan. Remedial Investigation/Feasibility Study, Former DuPont Works Site, DuPont, WA.

### 3 Sample Case

The sample data groups (SDGs) identified in Table A-1 were included in this data review.

**Table A-1 – Sample Data Groups Included in the Data Review**

Sound Analytical Services Data Group Number	Date Sampled
96864	March 19, 2001
96890	March 20, 2001
96924	March 21, 2001
96959	March 22, 2001
97027	March 27, 2001
97185	April 3, 2001
97281	April 5, 2001
97962	May 7, 2001

### 4 Laboratory Report and Reporting of Required Analyses

The laboratory reports included method blanks, surrogate recoveries, sample results, sample preparation logs, matrix spike results and matrix duplicate results. Blank spike data were reported only when matrix spike recovery data were outside of the control limits. Generally, the reports were adequate to evaluate the data quality given that blank spikes are not consistently reported. All sample analyses were reported as requested.

### 5 Chain of Custody and Holding Times

Samples were maintained under chain of custody until arrival at the laboratory. Samples were submitted to the laboratory on the day of sample collection. All sample bottles were received in good condition. The samples were digested and analyzed within the method-required holding times. Holding times were within specifications of the Management Plan.

### 6 Method and Field Blanks

Method blanks were used to determine if samples were contaminated through laboratory procedures or equipment. The laboratory method blanks were free of target analytes. The QC frequency requirement of one laboratory blank per analytical batch was met.

Field blanks (rinse blanks) were collected to assess potential cross-contamination in the field. Two rinse blanks were collected and analyzed for arsenic and lead. The field blanks were free of contamination. Data qualifiers were not assigned to associated data based on method or field blank results.

### 7 Surrogate Recoveries

Laboratory performance on individual samples was assessed by reviewing the recoveries of system monitoring compounds (surrogates).

#### Explosives by EPA 8330

Recoveries of the surrogate 3,4-dinitrotoluene were above the laboratory control limits of 63-119% due to sample matrix interference in seven samples in SDG 97281: (01-S648-SO- [DS-648-A-2]-C-000 (356%), 01-S648-SO- [DS-648-B-2]-C-000 (622%), 01-S648-SO- [DS-648-C-2]-C-000 (136%), 01-S648-SO-

[DS-648-D-2]-C-000 (175%), 01-S648-SO- [DS-648-F-2]-C-000 (646%), 01-S648-SO- [DS-648-G-2]-C-000 (265%) and 01-S648-SO- [DS-648-H-2]-C-000 (520%)) and in seven samples in SDG 97027: (01-C648-SO- [648-DS-A]-C1-000 (287%), 01-C648-SO-[648-DS-B]-C1-000 (243%), 01-C648-SO-[648-DS-C]-C1-000 (588%), 01-C648-SO-[648-DS-D]-C1-000 (193%), 01-C648-SO-[648-DS-E]-C1-000 (129%), 01-C648-SO-[648-DS-F]-C1-000 (124%) and 01-C648-SO-[648-DS-G]-C1-000 (130%)). Sample results for 2,4,6-trinitrotoluene (2,4,6-TNT), 2,4-dinitrotoluene (2,4-DNT), and 2,6-dinitrotoluene (2,6-DNT) reported above the reporting limits for these samples have been qualified as estimated and flagged "J". Sample results reported as not detected were not qualified based on surrogate recoveries.

## **8 Matrix Spikes/Blank Spikes**

Matrix spike (MS) analyses were used to assess matrix effects with respect to the analytical data. The QC frequency requirement of one MS per analytical batch or one MS per 20 samples was met. In some cases, the MS was performed on samples unrelated to this site. Samples included in SAS sample delivery groups (SDGs) 97185 and 97962 and a subset of samples included in SDGs 96890 and 96924 are associated with MS analyses performed on samples unrelated to this site. Data qualifiers were not assigned to sample data based on MS recoveries from non-project samples. Blank spike (BS) analyses were used to assess the overall performance of the analytical system when matrix spike recoveries were not acceptable.

### Arsenic and Lead by EPA 6010

The MS results were compared to the method control limits of 75 to 125%. For matrix spikes performed on site samples, spike recoveries ranged from 93 to 122 percent for arsenic and 4 to 106 percent for lead. The lead recovery (4%) for the MS performed on sample 01-C625-SO- [625-A-DS]-C6-000 (SDG 96864) was outside of the control limits due to high concentrations of lead in the parent sample. Per data validation guidelines, when the concentration of the analyte in the parent sample is greater than 4X the spike level, data are not qualified based on the matrix spike recovery. Data qualifiers were not assigned to associated data based on matrix spike results.

Based on review of the sample preparation log sheets, blank spikes were prepared at the appropriate frequency although the results were reported only when MS recoveries were outside of control limits. The blank spike recoveries provided were all within the control limits of 80 to 120%. Data provided included sets of blank spike/blank spike duplicates for lead associated with samples from SDG 96864 and one set for lead associated with samples from SDG 96924 where the MS was performed on a non-project sample. Data qualifiers were not assigned to associated samples based on blank spike/blank spike duplicate results.

### Explosives by EPA 8330

The recoveries of 2,4,6-trinitrotoluene 2,4,6-TNT (72.8%) in the MS and 2,6-DNT (149%) in the MSD performed on sample 01-S648-SO- [DS-648-A-2]-C-000 (SDG 97281) were outside of the laboratory control limits of 73-108% for 2,4,6-TNT and 79-103% for 2,6-DNT. The relative percent differences (RPDs) for 2,4,6-TNT (36%) and 2,6-DNT (47%) were greater than the RPD control limits of 18% for 2,4,6-TNT and 10% for 2,6-DNT. The recoveries of 2,4,6-TNT in the MS (69.2%) and the MSD (72.3%) performed on sample 01-S648-SO- [648-DS-J]-C1-000 (SDG 97027) were outside the control limits of 73-108% for 2,4,6-TNT. Sample results for samples 01-S648-SO- [DS-648-A-2]-C-000 and 01-S648-SO- [648-DS-J]-C1-000 were previously qualified based on surrogate recovery.

### Diesel Range and Motor Oil Range TPH by NWTPH-Dx

An MS/MSD was not performed on the sample submitted for diesel range and motor oil range TPH analysis. Data were assessed based on the BS/BSD results that were acceptable.

## **9 Laboratory Duplicates**

Laboratory duplicate results were used to assess the precision of laboratory measurements. The laboratory duplicate results were compared to the project control limit for relative percent difference (RPD) of 35%. The QC frequency requirement of one duplicate per analytical batch or one duplicate per 20 samples was met. In some cases, the duplicate was performed on samples unrelated to this site. Samples included in SAS SDG 97185 and a subset of samples included in SDGs 96890, 96924 and 97962 are associated with duplicate analyses performed on samples unrelated to this site. Data qualifiers were not assigned to associated sample data based on duplicate results from non-project samples.

## **10 Field Duplicates**

Field duplicate samples were used to assess sampling precision and representativeness. The QC frequency requirement of one field duplicate for 5 percent of the total samples collected was met for metals and explosives analyses. Eight sets of field duplicate samples (seven for metals analysis, one for explosives analysis) were collected. Table A-2 presents the RPDs of detected compounds that were calculated for the duplicate pairs. Because only one sample was analyzed for diesel-range and motor oil-range petroleum hydrocarbons, a field duplicate was not collected for this analysis.

**Table A-2 – RPD of Detected Compounds**

Sample ID	Duplicate ID	Analyte	Primary Result (mg/kg)	Duplicate Result (mg/kg)	RPD %
01-C620-SO-[620-DS-C]-C1-000	01-C620-SO-[620-DS-G]-C1-000	Arsenic	61	90	38
		Lead	430	420	2
01-C629-SO-[629-DS-E]-C1-000	01-C629-SO-[629-DS-F]-C1-000	Arsenic	230	260	12
		Lead	3,600	5,000	33
01-C530-SO-[530-DS-F]-C1-000	01-C530-SO-[530-DS-G]-C1-000	Arsenic	11	8.7	23
		Lead	96	150	44
01-C543-SO-[543-DS-H]-C1-000	01-C543-SO-[543-DS-I]-C1-000	Arsenic	5.4	7.5	33
		Lead	170	170	NC
01-C558-SO-[558-DS-E]-C1-000	01-C558-SO-[558-DS-F]-C1-000	Arsenic	4.6	4.3	7
		Lead	32	31	3.2
01-S536-SO-[536-DS-E]-C1-000	01-S536-SO-[536-DS-F]-C1-000	Arsenic	190	180	5.4
		Lead	1,500	1,800	18
01-C632-SO-[632-DS-C]-C1-000	01-C632-SO-[632-DS-D]-C1-000	Arsenic	19	15	24
		Lead	36	29	22
01-C648-SO-[648-DS-I]-C1-000	01-C648-SO-[648-DS-J]-C1-000	2,4,6-TNT	0.11	0.12	9
		2,4-DNT	0.16	0.098	48
		2,6-DNT	0.076	0.057	29

## **11 Reporting Limits**

Reporting limits were reviewed to ensure that results reported meet project goals. The reporting limits are acceptable for the project needs. The data are summarized in Tables A-3, A-4, and A-5 for metals, explosives and petroleum hydrocarbons, respectively.



**Table A-3**  
**Soil Analytical Results for Arsenic and Lead**  
**Stockpile Interim Action Program**

Sample ID	Date Sampled	Arsenic (mg/kg)	Lead (mg/kg)	Field Duplicate Sample ID
01-C625-SO-[625-A-DS]-C6-000	19-Mar-01	160	1200	
01-C625-SO-[625-B-DS]-C6-000	19-Mar-01	78	1200	
01-C625-SO-[625-C-DS]-C6-000	19-Mar-01	48	300	
01-C650-SO-[650-A-DS]-C6-000	19-Mar-01	110	440	
01-C650-SO-[650-B-DS]-C6-000	19-Mar-01	66	950	
01-C621-SO-[621-A-DS]-C6-000	19-Mar-01	200	480	
01-C621-SO-[621-B-DS]-C6-000	19-Mar-01	510	270	
01-C624-SO-[624-A-DS]-C6-000	19-Mar-01	4.8	210	
01-C802-SO-[802-A-DS]-C6-000	19-Mar-01	42	600	
01-C510-SO-[510-A-DS]-C6-000	19-Mar-01	27	1900	
01-C510-SO-[510-B-DS]-C6-000	19-Mar-01	25	1100	
01-C803-SO-[803-A-DS]-C6-000	19-Mar-01	77	13	
01-C800-SO-[800-A-DS]-C6-000	19-Mar-01	140	1000	
01-C801-SO-[801-A-DS]-C6-000	19-Mar-01	83	940	
01-C620-SO-[620-DS-A]-C1-000	20-Mar-01	480	140	01-C620-SO-[620-DS-G]-C1-000
01-C620-SO-[620-DS-B]-C1-000	20-Mar-01	78	620	
01-C620-SO-[620-DS-C]-C1-000	20-Mar-01	61	430	
01-C620-SO-[620-DS-G]-C1-000	20-Mar-01	90	420	
01-C620-SO-[620-DS-D]-C1-000	20-Mar-01	81	270	
01-C620-SO-[620-DS-E]-C1-000	20-Mar-01	31	320	
01-C620-SO-[620-DS-F]-C1-000	20-Mar-01	61	360	
01-C629-SO-[629-DS-A]-C1-000	20-Mar-01	270	4100	01-C629-SO-[629-DS-F]-C1-000
01-C629-SO-[629-DS-B]-C1-000	20-Mar-01	260	3800	
01-C629-SO-[629-DS-C]-C1-000	20-Mar-01	320	4500	
01-C629-SO-[629-DS-D]-C1-000	20-Mar-01	200	4600	
01-C629-SO-[629-DS-E]-C1-000	20-Mar-01	230	3600	
01-C629-SO-[629-DS-F]-C1-000	20-Mar-01	260	5000	
01-C651-SO-[651-DS-A]-C1-000	20-Mar-01	3	12	01-C530-SO-[530-DS-G]-C1-000
01-C804-SO-[804-DS-A]-C1-000	20-Mar-01	23	23	
01-C530-SO-[530-DS-A]-C1-000	20-Mar-01	7.3	270	
01-C530-SO-[530-DS-B]-C1-000	20-Mar-01	8.7	190	
01-C530-SO-[530-DS-C]-C1-000	20-Mar-01	11	100	
01-C530-SO-[530-DS-E]-C1-000	20-Mar-01	12	100	
01-C530-SO-[530-DS-D]-C1-000	20-Mar-01	6.1	68	
01-C530-SO-[530-DS-F]-C1-000	20-Mar-01	11	96	
01-C530-SO-[530-DS-G]-C1-000	20-Mar-01	8.7	150	
01-C543-SO-[543-DS-A]-C1-000	21-Mar-01	6.2	180	01-C543-SO-[543-DS-I]-C1-000
01-C543-SO-[543-DS-B]-C1-000	21-Mar-01	5.4	220	
01-C543-SO-[543-DS-C]-C1-000	21-Mar-01	6.3	850	
01-C543-SO-[543-DS-D]-C1-000	21-Mar-01	7.6	160	
01-C543-SO-[543-DS-E]-C1-000	21-Mar-01	5	220	
01-C543-SO-[543-DS-F]-C1-000	21-Mar-01	5.7	170	
01-C543-SO-[543-DS-G]-C1-000	21-Mar-01	4.8	160	
01-C543-SO-[543-DS-H]-C1-000	21-Mar-01	5.4	170	
01-C543-SO-[543-DS-I]-C1-000	21-Mar-01	7.5	170	
01-C545-SO-[545-DS-A]-C1-000	21-Mar-01	5.8	250	
01-C556-SO-[556-DS-A]-C1-000	21-Mar-01	7.8	160	
01-C556-SO-[556-DS-B]-C1-000	21-Mar-01	5.5	140	
01-C555-SO-[555-DS-A]-C1-000	21-Mar-01	3.9	190	
01-C555-SO-[555-DS-B]-C1-000	21-Mar-01	5.3	350	
01-C558-SO-[558-DS-A]-C1-000	21-Mar-01	3.9	37	
01-C558-SO-[558-DS-B]-C1-000	21-Mar-01	6	89	
01-C558-SO-[558-DS-C]-C1-000	21-Mar-01	4.9	35	

Table A-3

**Soil Analytical Results for Arsenic and Lead  
Stockpile Interim Action Program**

Sample ID	Date Sampled	Arsenic (mg/kg)	Lead (mg/kg)	Field Duplicate Sample ID
01-C558-SO-[558-DS-D]-C1-000	21-Mar-01	6	39	01-C558-SO-[558-DS-F]-C1-000
01-C558-SO-[558-DS-E]-C1-000	21-Mar-01	4.6	32	
01-C558-SO-[558-DS-F]-C1-000	21-Mar-01	4.3	31	
01-C544-SO-[544-DS-A]-C1-000	21-Mar-01	3.7	390	
01-C544-SO-[544-DS-B]-C1-000	21-Mar-01	4.1	460	
01-C544-SO-[544-DS-C]-C1-000	21-Mar-01	2.8	320	
01-C544-SO-[544-DS-D]-C1-000	21-Mar-01	4.1	350	
01-C552-SO-[552-DS-A]-C1-000	22-Mar-01	7.9	550	01-C632-SO-[632-DS-D]-C1-000
01-C631-SO-[631-DS-A]-C1-000	22-Mar-01	18	46	
01-C631-SO-[631-DS-B]-C1-000	22-Mar-01	16	46	
01-C631-CO-[631-DS-C]-C1-000	22-Mar-01	12	38	
01-C631-SO-[631-DS-D]-C1-000	22-Mar-01	14	56	
01-C631-SO-[631-DS-E]-C1-000	22-Mar-01	12	44	
01-C631-SO-[631-DS-F]-C1-000	22-Mar-01	23	100	
01-C631-SO-[631-DS-G]-C1-000	22-Mar-01	17	140	
01-C632-SO-[632-DS-A]-C1-000	22-Mar-01	25	33	
01-C632-SO-[632-DS-B]-C1-000	22-Mar-01	11	23	
01-C632-SO-[632-DS-C]-C1-000	22-Mar-01	19	36	
01-C632-SO-[632-DS-D]-C1-000	22-Mar-01	15	29	
01-C805-SO-[805-DS-A]-C1-000	22-Mar-01	20	45	
01-C806-SO-[806-DS-A]-C1-000	22-Mar-01	7.9	15	
01-C647-SO-[647-DS-A]-C1-000	22-Mar-01	34	300	
01-C647-SO-[647-DS-B]-C1-000	22-Mar-01	34	200	
01-C647-SO-[647-DS-C]-C1-000	22-Mar-01	27	100	
01-C647-SO-[647-DS-D]-C1-000	22-Mar-01	17	81	
01-C645-SO-[645-DS-A]-C1-000	22-Mar-01	22	100	01-S536-SO-[536-DS-F]-C1-000
01-C645-SO-[645-DS-B]-C1-000	22-Mar-01	22	91	
01-S536-SO-[536-DS-A]-C1-000	3-Apr-01	240	3100	
01-S536-SO-[536-DS-B]-C1-000	3-Apr-01	37	1700	
01-S536-SO-[536-DS-C]-C1-000	3-Apr-01	300	1900	
01-S536-SO-[536-DS-D]-C1-000	3-Apr-01	68	1400	
01-S536-SO-[536-DS-E]-C1-000	3-Apr-01	190	1500	
01-S536-SO-[536-DS-F]-C1-000	3-Apr-01	180	1800	
R62C73	7-May-01	31	43	

J - Estimated Value, Qualifier assigned during data review

Note: Two rinsate blanks were collected on March 19, 2001 (RIN-031901) and April 3, 2001 (RIN-040301).

Arsenic and lead were not detected in either rinsate blank and results were reported as not detected for both elements (< 0.01 mg/L).

**Table A-4**  
**Soil Analytical Results for Explosives**  
**Stockpile Interim Action Program**

Sample ID	Date Sampled	2,4,6-Trinitrotoluene (mg/kg)	2,4-Dinitrotoluene (mg/kg)	2,6-Dinitrotoluene (mg/kg)	Field Duplicate Sample ID
01-C648-SO-[648-DS-A]-C1-000	27-Mar-01	0.54 J	1.1 J	2.2 J	01-C648-SO-[648-DS-J]-C1-000
01-C648-SO-[648-DS-B]-C1-000	27-Mar-01	0.42 J	0.76 J	0.047 U	
01-C648-SO-[648-DS-C]-C1-000	27-Mar-01	0.7 J	0.48 J	52 J	
01-C648-SO-[648-DS-D]-C1-000	27-Mar-01	0.34 J	0.16 J	0.046 U	
01-C648-SO-[648-DS-E]-C1-000	27-Mar-01	0.29 J	0.37 J	0.14 J	
01-C648-SO-[648-DS-F]-C1-000	27-Mar-01	0.17 J	2.6 J	0.047 U	
01-C648-SO-[648-DS-G]-C1-000	27-Mar-01	0.19 J	0.29 J	0.095 J	
01-C648-SO-[648-DS-H]-C1-000	27-Mar-01	0.067	0.068	0.047 U	
01-C648-SO-[648-DS-I]-C1-000	27-Mar-01	0.11	0.16	0.076	
01-C648-SO-[648-DS-J]-C1-000	27-Mar-01	0.12	0.098	0.057	
01-S648-SO-[DS-648-A-2]-C-000	5-Apr-01	0.9 J	0.13 J	0.4 J	
01-S648-SO-[DS-648-B-2]-C-000	5-Apr-01	9 J	2.7 J	2.2 J	
01-S648-SO-[DS-648-C-2]-C-000	5-Apr-01	0.38 J	0.093 J	0.074 J	
01-S648-SO-[DS-648-D-2]-C-000	5-Apr-01	0.48 J	10 J	0.047 U	
01-S648-SO-[DS-648-E-2]-C-000	5-Apr-01	0.078	0.14	0.11	
01-S648-SO-[DS-648-F-2]-C-000	5-Apr-01	1.3 J	0.21 J	1.1 J	
01-S648-SO-[DS-648-G-2]-C-000	5-Apr-01	0.57 J	0.23 J	0.45 J	
01-S648-SO-[DS-648-H-2]-C-000	5-Apr-01	3 J	0.65 J	1.4 J	
01-S648-SO-[DS-648-I-2]-C-000	5-Apr-01	0.097	0.11	0.071	
01-S648-SO-[DS-648-J-2]-C-000	5-Apr-01	0.12	0.13	0.075	
HOFRES	7-May-01	0.05 U	0.05 U	0.05 U	

J - Estimated Value, qualifier assigned during data review

J - The analyte was analyzed for, but was not detected above the reporting limit shown.

**Table A-5**  
**Soil Analytical Results for Petroleum Hydrocarbons**  
**Stockpile Interim Action Program**

Sample ID	Date Sampled	Total Petroleum Hydrocarbons	
		Diesel-range (mg/kg)	Motor Oil-range (mg/kg)
807	7-May-01	260*	250**

\* The chromatogram suggests this may be aged or degraded diesel.

\*\* The chromatogram does not match a typical motor oil pattern.

# Laboratory Analytical Data Validation Results

## 1 Summary

The soil analytical data reviewed from the background samples are acceptable for use based on a majority of acceptable quality control data. The data meet criteria specified in the 1992 Hart Crowser Management Plan.<sup>1</sup> The data may be used to assess analyte concentrations with the stated qualifications.

## 2 Introduction

This section presents a quality control (QC) review of data generated from collection and analysis of soil samples from the former DuPont Works Site in Dupont, Washington, from January 29 through April 3, 2001. Samples were submitted to Sound Analytical Services, Inc. for analysis. This review includes evaluation of the following:

- Laboratory report and reporting of required analyses
- Chain of custody and holding times
- Method blanks
- Matrix spike / blank spikes (MS / BS)
- Laboratory duplicates
- Field duplicates
- Reporting limits

The data quality review was conducted using guidance from the following documents:

- National Functional Guidelines for Organic Data Review, EPA, February 1994.
- Remedial Investigation/Feasibility Study, Former Dupont Works Site Management Plan, Hart Crowser, January 1992.

Criteria used to assess the data are found in Section 5 of the Management Plan. The analytical data has been compared to the Management Plan limits. The samples were analyzed for the following chemicals, using the noted analytical methods.

- Arsenic            EPA 6010
- Lead             EPA 6010

## 3 Sample Case

The sample data groups identified in Table A-1 were included in this data review.

**Table A-1 – Sample Data Groups Included in the Data Review**

Sound Analytical Services Data Group Number	Date Sampled
95757	1/29/2001
95881	1/30, 1/31, and 2/1/2001
95897	2/2/2001

<sup>1</sup> Hart Crowser. January 17, 1992. Management Plan. Remedial Investigation/Feasibility Study, Former DuPont Works Site, DuPont, WA.

**Table A-1 – Sample Data Groups Included in the Data Review**

95980	2/5/2001
96014	2/7/2001
96084	2/8 – 2/9/2001
96171	2/12 – 2/14/2001
96257	2/14 – 2/15/2001
96322	2/20 – 2/21/2001
96362	2/22 – 2/23/2001
97186	4/3/2001
97187	4/3/2001

#### **4 Laboratory Report and Reporting of Required Analyses**

The laboratory report was complete; all QC results were included. The project scope of work stated that URS Inc., (URS) would provide industry-accepted evaluation of data quality and documentation of sample acquisition and custody. The reports provide all necessary information to complete this review. All analytical methods were reported as requested.

#### **5 Chain of Custody and Holding Times**

Samples were maintained under chain of custody until arrival at the laboratory. Samples were preserved and cooled until arrival at the laboratory. Sample bottles were in good condition. The samples were extracted and analyzed within the 6 month holding time. Holding times were within specifications of the Management Plan.

#### **6 Method and Field Blanks**

Method blanks were used to determine if samples were contaminated through laboratory procedures or equipment. The laboratory method blanks were free of target analytes. The QC frequency requirement of one laboratory blank per analytical batch was met. One rinse blank was collected. The field rinse blank was free of contamination. No data require qualification based on field rinse blank contamination.

#### **7 Matrix Spikes/Blank Spikes**

Matrix spike (MS) analyses were used to assess matrix effects with respect to the analytical data. The QC frequency requirement of one MS and one blank spike (BS) per analytical batch or one MS and one BS per 20 samples, was met. In instances where the concentration of the sample is at least 4 times greater than the spike added, the MS percent recoveries are not used to validate the associated sample data. The laboratory included BS reports only if the MS data were non-compliant.

The MS results were compared to evaluate the accuracy of laboratory procedures. The spike recoveries ranged from 81 to 107 percent and were within the laboratory-established control limits of 75-125, with the exception listed below. One blank spike was reported and was within the laboratory-established control limits of 80-120.

- MS 95881-01 (2/9/01): the lead percent recovery was below the control limit at 69%. Associated sample lead results were qualified as estimated and flagged with a "J".

#### **8 Laboratory Duplicates**

The relative percent differences (RPDs) ranged from 0 to 29 percent and were within the laboratory-established control limits of 35%, with two exceptions. The lead RPD for laboratory duplicate 96322-61 (3/5/01) was above the control limit at 39% due to matrix interference. Associated sample lead results

were qualified as estimated and were flagged with a "J". The arsenic and lead RPDs for laboratory duplicate 95881-61 (2/13/01) were greater than the control limit at 45%. Associated sample arsenic and lead results were qualified as estimated and flagged with a "J".

## 9 Field Duplicates

Field duplicate samples were used to assess sampling precision and representativeness. The QC frequency requirement of one field duplicate for 5 percent of the total samples, or one field duplicate per day at a minimum, specified in the Management Plan, was met. Twenty-seven sets of field duplicate samples were collected. Table A-2 presents the RPD of detected compounds that were calculated for the duplicate pairs. The RPD is calculated only for sample results that are 5 times greater than the detection limit. The RPDs were acceptable (i.e., less than 35%) with the exception of twelve duplicate pairs with RPD greater than 35%. Arsenic and lead results for the sample and duplicate pairs were qualified as estimated and flagged with a "J" if the RPD was greater than 35%. The average RPD for all field duplicates collected was 30%, which is acceptable for this project.

**Table A-2 – RPD of Detected Compounds**

Sample ID & Duplicate ID	Analyte	Primary Result (mg/kg)	Duplicate Result (mg/kg)	RPD %
R74C67/R74C66	Arsenic	47	20	81
	Lead	120	56	73
R74C69/R74C65	Arsenic	66	43	42
	Lead	130	120	8
R79C74/R79C66	Arsenic	160	350	75
	Lead	39	54	32
R77C73/R77C66	Arsenic	25	31	21
	Lead	25	35	33
R72C74/R72C66	Arsenic	39	51	27
	Lead	46	79	53
R72C71/R72C65	Arsenic	51	62	19
	Lead	120	140	15
R63C74/R63C66	Arsenic	64	56	13
	Lead	57	84	38
R61C68/R61C66	Arsenic	42	48	13
	Lead	110	120	9
R69C72/R69C66	Arsenic	66	52	24
	Lead	85	49	54
R62C76/R60C76	Arsenic	19	30	45
	Lead	64	88	32
R65C81/R60C81	Arsenic	4.7	9.3	NC
	Lead	10	19	62
R73C83/R74C83	Arsenic	21	29	32
	Lead	33	40	19
R72C84/R73C84	Arsenic	4	4.6	NC
	Lead	7.8	11	NC
R63C86/R62C86	Arsenic	22	26	17
	Lead	46	50	8
R64C87/R63C87	Arsenic	9.9	13	27
	Lead	20	19	5
R68C88/R69C88	Arsenic	27	31	14
	Lead	37	39	5

**Table A-2 – RPD of Detected Compounds**

Sample ID & Duplicate ID	Analyte	Primary Result (mg/kg)	Duplicate Result (mg/kg)	RPD %
R47C66/R49C66	Arsenic	58	69	17
	Lead	96	81	17
R31C55/R31C54	Arsenic	17	16	6
	Lead	38	43	12
R30C55/R30C54	Arsenic	24	32	29
	Lead	53	79	39
R29C55/R29C54	Arsenic	12	12	0
	Lead	11	25	78
R29C61/R25C61	Arsenic	25	20	22
	Lead	41	37	10
R42C64/R44C64	Arsenic	7.7	10	NC
	Lead	8.9	13	NC
R37C62/R40C62	Arsenic	42	37	13
	Lead	30	29	3
R37C63/R42C63	Arsenic	31	46	39
	Lead	19	23	19
R22C56/R22C54	Arsenic	29	17	52
	Lead	31	21	38
R66C89/R66C90	Arsenic	10	14	33
	Lead	27	27	0
R65C89/R65C90	Arsenic	22	20	10
	Lead	40	37	8

## 10 Reporting Limits

To ensure the level of analytical reporting sensitivity meets project goals, reporting limits were reviewed. The reporting limits are acceptable for the project needs. No data require qualification based on reporting limits.



# Laboratory Analytical Data Validation Results

## 1 Summary

The soil analytical data reviewed from the Sequelitchew Creek Canyon NGRR are acceptable for use based on a majority of acceptable quality control data. The data meet criteria specified in the 1992 Hart Crowser Management Plan.<sup>1</sup> The data may be used to assess analyte concentrations with the stated qualifications.

## 2 Introduction

This section presents a quality control (QC) review of data generated from collection and analysis of soil samples from the former DuPont Works Site in Dupont, Washington, from January 10, through 16, 2001. Samples were submitted to Sound Analytical Services, Inc. for analysis. This review includes evaluation of the following:

- Laboratory report and reporting of required analyses
- Chain of custody and holding times
- Method blanks
- Matrix spike / blank spikes (MS / BS)
- Laboratory duplicates
- Field duplicates
- Reporting limits

The data quality review was conducted using guidance from the following documents:

- National Functional Guidelines for Organic Data Review, EPA, February 1994.
- Remedial Investigation/Feasibility Study, Former Dupont Works Site Management Plan, Hart Crowser, January 1992.

Criteria used to assess the data are found in Section 5 of the Management Plan. The analytical data has been compared to the Management Plan limits. The samples were analyzed for the following chemicals, using the noted analytical methods.

- Arsenic           EPA 6010
- Lead             EPA 6010

## 3 Sample Case

The sample data groups identified in Table A-1 were included in this data review.

**Table A-1 – Sample Data Groups Included in the Data Review**

Sound Analytical Services Data Group Number	Date Sampled	Sample ID
95386	11 Jan 01	01-OS02-SS-[LR-68-525W]-C1-000
95386	11 Jan 01	01-OS02-SS-[LR-68-600W]-C1-000
95386	11 Jan 01	01-OS02-SS-[LR-68-675W]-C1-000
95386	11 Jan 01	01-OS02-SS-[LR-68-750W]-C1-000
95386	11 Jan 01	01-OS02-SS-[LR-68-825W]-C1-000
95386	11 Jan 01	01-OS02-SS-[LR-68-900W]-C1-000

<sup>1</sup> Hart Crowser. January 17, 1992. Management Plan. Remedial Investigation/Feasibility Study, Former DuPont Works Site, DuPont, WA.

**Table A-1 – Sample Data Groups Included in the Data Review**

Sound Analytical Services Data Group Number	Date Sampled	Sample ID
95386	11 Jan 01	01-OS02-SS-[LR-68-975W]-C1-000
95386	11 Jan 01	01-OS02-SS-[LR-68-1050W]-C1-000
95386	11 Jan 01	01-OS02-SS-[LR-68-1125W]-C1-000
95386	11 Jan 01	01-OS02-SS-[LR-68-1200W]-C1-000
95386	11 Jan 01	01-OS02-SS-[LR-68-1275W]-C1-000
95386	11 Jan 01	01-OS02-SS-[LR-68-1350W]-C1-000
95386	11 Jan 01	01-OS02-SS-[LR-68-1425W]-C1-000
95386	11 Jan 01	01-OS02-SS-[LR-68-1500W]-C1-000
95386	11 Jan 01	01-OS02-SS-[LR-68-1575W]-C1-000
95386	11 Jan 01	01-OS02-SS-[LR-68-1600W]-C1-000
95386	11 Jan 01	01-OS02-SS-[LR-68-1650W]-C1-000
95386	11 Jan 01	01-OS02-SS-[LR-68-1725W]-C1-000
95386	11 Jan 01	01-OS02-SS-[LR-68-1800W]-C1-000
95386	11 Jan 01	01-OS02-SS-[LR-68-1875W]-C1-000
95386	11 Jan 01	01-OS02-SS-[LR-68-1950W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-0]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-2025W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-2100W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-2175W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-2250W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-2325W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-2400W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-2475W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-2550W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-2600W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-2625W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-2700W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-2775W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-2850W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-2925W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-3000W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-3075W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-3150W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-3225W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-3300W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-3375W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-3450W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-3525W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-3600W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-3675W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-3750W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-3825W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-3900W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-3975W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-4025W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-4050W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-4125W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-4175W]-C1-000

**Table A-1 – Sample Data Groups Included in the Data Review**

Sound Analytical Services Data Group Number	Date Sampled	Sample ID
95438	12 Jan 01	01-OS02-SS-[LR-68-4200W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-4275W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-4325W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-4350W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-4425W]-C1-000
95438	12 Jan 01	01-OS02-SS-[LR-68-4475W]-C1-000

#### **4 Laboratory Report and Reporting of Required Analyses**

The laboratory report was complete; all QC results were included. The project scope of work stated that URS Inc., (URS) would provide industry-accepted evaluation of data quality and documentation of sample acquisition and custody. The reports provide all necessary information to complete this review. All analytical methods were reported as requested.

#### **5 Chain of Custody and Holding Times**

Samples were maintained under chain of custody until arrival at the laboratory. Samples were preserved and cooled until arrival at the laboratory. Sample bottles were in good condition. The samples were extracted and analyzed within the 6 month holding time. Holding times were within specifications of the Management Plan.

#### **6 Method and Field Blanks**

Method blanks were used to determine if samples were contaminated through laboratory procedures or equipment. The laboratory method blanks were free of target analytes. The QC frequency requirement of one laboratory blank per analytical batch was met. Three rinse blanks were analyzed. The field rinse blanks were free of contamination. No data require qualification based on field rinse blank contamination.

#### **7 Matrix Spikes/Blank Spikes**

Matrix spike (MS) analyses were used to assess matrix effects with respect to the analytical data. The QC frequency requirement of one MS and one blank spike (BS) per analytical batch or one MS and one BS per 20 samples, was met. In instances where the concentration of the sample is at least 4 times greater than the spike added, the MS percent recoveries are not used to validate the associated sample data. The laboratory included BS reports only if the MS data were non-compliant.

The MS results were compared to evaluate the accuracy of laboratory procedures. The spike recoveries ranged from 88 to 117 percent and were within the laboratory-established control limits of 75-125 with the exceptions listed below. One blank spike was reported and was within the laboratory-established control limits of 80-120. No data require qualification based on MS or BS percent recoveries because the concentration of the spiked sample (matrix spike 95344-20, 1/18/01) was at least 4 times greater than the spike added.

#### **8 Laboratory Duplicates**

The relative percent differences (RPDs) ranged from 0 to 26 percent and were within the laboratory-established control limits of less than 35%, with one exception. The lead RPD for laboratory duplicate 95344-20 (1/17/01) was above the control limit at 78% due to matrix interference. Associated sample lead results were qualified as estimated and were qualified with a "J".

## 9 Field Duplicates

Field duplicate samples were used to assess sampling precision and representativeness. The QC frequency requirement of one field duplicate for 5 percent of the total samples, or one field duplicate per day at a minimum, specified in the Management Plan, was met. Seven sets of field duplicate samples were collected. Table A-2 presents the RPD of detected compounds that were calculated for the duplicate pairs. The RPDs were acceptable (i.e., less than 35%) with the exception of two duplicate pairs LR-68-1575W/1600W and LR-68-4425/4475. The arsenic results for LR-68-1575W and the lead results for LR-68-4425 were qualified as estimated and flagged with a "J" due to the high duplicate RPD.

**Table A-2 – RPD of Detected Compounds**

Sample ID & Duplicate ID	Analyte	Primary Result (mg/kg)	Duplicate Result (mg/kg)	RPD %
LR-68-1575W/LR-68-1600W	Arsenic	180	120	40
	Lead	21	17	21
LR-68-3975W/LR-68-4025W	Arsenic	420	380	10
	Lead	28	26	7
LR-68-4125W/LR-68-4175W	Arsenic	350	270	26
	Lead	37	33	11
LR-68-4275W/LR-68-4325W	Arsenic	420	430	2
	Lead	55	60	9
LR-68-4425W/LR-68-4475W	Arsenic	290	370	24
	Lead	39	190	132
LR-68-2550W/LR-68-2600W	Arsenic	340	270	23
	Lead	33	26	24

## 10 Reporting Limits

To ensure the level of analytical reporting sensitivity meets project goals, reporting limits were reviewed. The reporting limits are acceptable for the project needs. No data require qualification based on reporting limits.

## **Summary**

The data reviewed are acceptable for use based on a majority of acceptable quality control data. The data meet criteria specified in the 1992 Hart Crowser Management Plan. The data may be used to assess analyte concentrations with the stated qualifications.

## **Introduction**

This section presents a quality control (QC) review of data generated from collection and analysis of soil samples from the Weyerhaeuser-Dupont site in Dupont, Washington, from September 10, 1999 through July 17, 2000. Samples were submitted to Sound Analytical Services, Inc. for analysis. This review includes evaluation of the following:

- Laboratory report and reporting of required analyses
- Chain of custody and holding times
- Method blanks
- Matrix spike / blank spikes (MS / BS)
- Laboratory duplicates
- Field duplicates
- Reporting limits

The data quality review was conducted using guidance from the following documents:

- National Functional Guidelines for Organic Data Review, EPA, February 1994.
- Remedial Investigation/Feasibility Study, Former Dupont Works Site Management Plan, Hart Crowser, January 1992.

Criteria used to assess the data are found in Section 5 of the Management Plan. The analytical data has been compared to the Management Plan limits.

The samples were analyzed for the following chemicals and chemical groups.

Arsenic	EPA 6010
Lead	EPA 6010

### Sample Case

The following sample data groups were included in this review.

SOUND ANALYTICAL SERVICES DATA GROUP NUMBER	DATE SAMPLED
84030	10 Sep 99
84055	13 Sep 99
84078	14 Sep 99
84117	15 Sep 99
84151	16 Sep 99
84215	20 Sep 99
84245	21 Sep 99
84297	22 Sep 99
84320	23 Sep 99
84401	27 Sep 99
84426	28 Sep 99
84479	29 Sep 99
84508	30 Sep 99
84520	1 Oct 99
84678	7 Oct 99
84745	11 Oct 99
84778	12 Oct 99
84800	13 Oct 99
84832	14 Oct 99
84863	15 Oct 99
84898	18 Oct 99
84932	19 Oct 99
84973	21 Oct 99
85323	4 Nov 99
86405	3 Jan 2000
87040	25 Jan 2000
87119	28 Jan 2000
87987	7 Mar 2000
89042	18 Apr 2000
89069	19 Apr 2000
89529	9 May 2000
89746	17 May 2000
89910	30 May 2000
90806	29 June 2000
91163	18 July 2000
91278	24 July 2000

### ***Laboratory Report and Reporting of Required Analyses***

The laboratory report was complete; all QC results were included. The project scope of work stated that URSGWC would provide industry-accepted evaluation of data quality and documentation of sample acquisition and custody. The reports provide all necessary information to complete this review.

### ***Chain of Custody and Holding Times***

Samples were maintained under chain of custody until arrival at the laboratory. Samples were preserved and cooled. Sample jars were in good condition.

The samples were extracted and analyzed within the 6 month holding time. No data require qualification based on missed holding times.

### ***Method and Field Blanks***

Method blanks were used to determine if samples were contaminated through laboratory procedures or equipment. The laboratory method blanks were free of target analytes. The QC frequency requirement of one laboratory blank per analytical batch was met. Field blanks were used to determine if samples were contaminated through sampling procedures or equipment. The rinse blanks had detections of lead or arsenic. No data require qualification based on these results.

SAMPLE ID	BATCH	ANALYTE	RESULT (mg/L)
Rinse Blank (rinsate)	84078	Lead	0.0032
Rinse Blank (rinsate 2)	84117	Lead	0.026
Rinse Blank (rinsate 3)	84117	Lead	0.016
Rinse Blank (rinsate 4)	84151	Lead	0.088
Rinse Blank (rinsate 5)	84215	Lead	0.031
Rinse Blank (rinsate 6)	84245	Arsenic Lead	0.034 0.026
Rinse Blank (rinsate 7)	84297	Lead	0.0061
Rinse Blank (rinsate 8)	84401	Lead	0.0065

### ***Matrix Spikes / Blank Spikes***

Matrix spike analyses were used to assess matrix effects with respect to the analytical data. Blank spike analyses were used to monitor the overall performance of the analysis, including sample preparation. The QC frequency requirement of one matrix spike and one blank spike per analytical batch or one matrix spike and one blank spike per 20 samples, was met.

The spike recoveries ranged from were within the control limits, with the following exceptions.

- Matrix spike 84055-1 (9-15/99): The lead percent recovery was above the control limits. The concentration of the spiked sample was at least 10 times greater than the spike added; therefore, no data were qualified.
- Matrix spike 84055-21 (9-15/99): The lead percent recovery was above the control limits. The concentration of the spiked sample was at least 10 times greater than the spike added; therefore, no data were qualified.

- Matrix spike 84078-42 (9/20/99): The lead matrix spike was not recovered. The concentration of the spiked sample was at least 10 times greater than the spike added; therefore, no data were qualified.
- Matrix spike 84117-1 (9/17/99): The lead matrix spike was not recovered. The concentration of the spiked sample was at least 10 times greater than the spike added; therefore, no data were qualified.
- Matrix spike 84117-21 (9/20/99): The lead matrix spike was not recovered. The concentration of the spiked sample was at least 10 times greater than the spike added; therefore, no data were qualified.
- Matrix spike 84151-1 (9/20/99): The arsenic percent recovery was below the control limits at 74%. The associated blank spike was within the control limits; therefore, no data were qualified.
- Matrix spike 84215-2 (9/22/99): The lead percent recovery was above the control limits. The concentration of the spiked sample was at least 10 times greater than the spike added; therefore, no data were qualified.
- Matrix spike 84215-22 (9/22/99): The lead percent recovery was below the control limits at 74%. The associated blank spike was within the control limits; therefore, no data were qualified.
- Matrix spike 84245-2 (9/21/99): The lead percent recovery was below the control limits at 64%. The associated blank spike was within the control limits; therefore, no data were qualified.
- Matrix spike 84245-40 (9/23/99): The percent recoveries were below the control limits for arsenic at 74% and lead at 72%. The associated blank spike percent recoveries were within the control limits; therefore, no data were qualified.
- Matrix spike 84297-22 (9/27/99): The percent recoveries were below the control limits for arsenic at 73% and lead at 72%. Associated quality control data were within the control limits; therefore, no data were qualified.
- Matrix spike 84297-42 (9/27/99): The percent recoveries were below the control limits for arsenic at 71% and lead at 69%. Associated quality control data were within the control limits; therefore, no data were qualified.
- Matrix spike 84320-1 (9/28/99): The percent recoveries were below the control limits for arsenic at 71% and lead at 66%. Associated quality control data were within the control limits; therefore, no data were qualified.
- Matrix spike 84320-21 (9/28/99): The percent recovery was above the control limit for lead at 133%. Associated quality control data were within the control limits; therefore, no data were qualified.
- Matrix spike 59069-21 (4/21/00): The arsenic and lead matrix spike percent recoveries were not recovered. The associated LCS and an additional matrix spike percent recoveries were within the control limits; therefore, no data were qualified.



- Blank spike S382 (9/20/99): The lead percent recovery was greater than the control limits at 133%. Associated data were qualified as estimated (J).
- Blank spike S392 (9/17/99): The lead percent recovery was greater than the control limits at 130%. Associated data were qualified as estimated (J).

### ***Laboratory Duplicates***

The laboratory duplicate relative percent differences (RPDs) were within the control limits, with the following exceptions.

- Laboratory duplicate 84030-15 (9/14/99): The lead RPD was above the control limit at 49% due to matrix interference. Associated quality control data were within the control limits; therefore, no data were qualified.
- Laboratory duplicate 84078-42 (9/20/99): The lead RPD was above the control limit at 58% due to matrix interference. Associated quality control data were within the control limits; therefore, no data were qualified.
- Laboratory duplicate 84508-21 (10/4/99): The arsenic RPD was above the control limit at 200%. The sample and duplicate results were not greater than five times the reporting limit; therefore, no data were qualified.
- Laboratory duplicate 85323-41 (11/5/99): The lead RPD was above the control limit at 46% due to matrix interference. Associated quality control data were within the control limits; therefore, no data were qualified.
- Laboratory duplicate 87040-41 (1/27/00): The arsenic RPD was above the control limit at 50% due to matrix interference. Associated quality control data were within the control limits; therefore, no data were qualified.

### ***Field Duplicates***

Field duplicate samples were used to assess sampling precision and representativeness. The RPD was calculated only for sample results greater than 5 times the reporting limit. A total of 42 duplicate pairs were collected which meets the QC frequency requirement of one field duplicate for 5 percent of the total samples or one field duplicate for each day of sampling, specified in the Management Plan. The duplicate pairs show good agreement, with the following exceptions:

- Duplicate pair 38-VS-96/117: the arsenic and lead results were qualified as estimated (J) due to the high duplicate RPDs.
- Duplicate pair 31-VS-586/587: the arsenic and lead results were qualified as estimated (J) due to the high duplicate RPDs.
- Duplicate pair 31-VS-639/686: the arsenic and lead results were qualified as estimated (J) due to the high duplicate RPDs.

SAMPLE ID & DUPLICATE ID	ANALYTE	PRIMARY RESULT (ug/L)	DUPLICATE RESULT (ug/L)	RPD %
31-VS-68/31-VS-83	arsenic	12	15	22
	lead	1000	1100	10
31-VS-74/31-VS-84	arsenic	15	13	14
	lead	4300	3500	21
31-VS-80/31-VS-85	arsenic	35	32	9
	lead	4200	4000	5
31-VS-137/31-VS-162	arsenic	35	26	30
	lead	2500	2100	17
31-VS-135/31-VS-163	arsenic	7.7	7.5	3
	lead	170	170	0
31-VS-171/31-VS-175	arsenic	6.1	6.9	12
	lead	260	280	7
31-VS-196/31-VS-216	--	--	--	--
31-VS-503/31-VS-504	lead	13	25	63
31-VS-518/31-VS-519	--	--	--	--
31-VS-526/31-VS-527	arsenic	15	15	0
31-VS-540/31-VS-541	--	--	--	--
31-VS-560/31-VS-561	arsenic	130	92	34
	lead	7700	4400	55
31-VS-570/31-VS-570	arsenic	11	9.7	13
	lead	26	20	26
31-VS-577/31-VS-578	arsenic	8.2	13	45
	lead	19	32	51
31-VS-586/31-VS-587	arsenic	120	30	120
	lead	74	47	45
31-VS-597/31-VS-598	arsenic	12	16	29
	lead	39	62	51
31-VS-615/31-VS-627	arsenic	11	10	10
	lead	13	13	0
31-VS-619/31-VS-628	arsenic	11	11	0
	lead	11	13	17
31-VS-624/31-VS-629	--	--	--	--
31-VS-639/31-VS-686	arsenic	45	17	90
	lead	130	41	104
31-VS-649/31-VS-687	arsenic	55	60	9
	lead	52	52	0
31-VS-659/31-VS-688	lead	11	7.6	37
31-VS-669/31-VS-689	arsenic	11	5.9	60
31-VS-679/31-VS-690	--	--	--	--
31-VS-713/31-VS-725	--	--	--	--
31-VS-724/31-VS-726	arsenic	12	14	15
	lead	21	25	17
19-VS-37/19-VS-44	lead	23	25	8
19-VS-30/19-VS-45	lead	20	17	16
19-VS-42/19-VS-46	arsenic	56	82	38
	lead	140	140	0
19-VS-50/19-VS-55	arsenic	90	86	5
	lead	280	310	10
APC-VS-11/APC-VS-17	arsenic	21	22	5
	lead	2600	2000	26

SAMPLE ID & DUPLICATE ID	ANALYTE	PRIMARY RESULT (U/L)	DUPLICATE RESULT (U/L)	RPD %
5-VS-121/5-VS-116	arsenic lead	2100 15	1600 20	27 29
26-VS-32/26-VS-35	--	--	--	
26-VS-39/26-VS-44	arsenic lead	180 23	180 25	0 8
18-VS-219/18-VS-224	--	--	--	--
12-VS-2/12-VS-7	arsenic lead	50 58	59 69	17 17
LR181-VS-1/LR181-VS-9	arsenic lead	51 62	57 68	11 9
38-VS-37/38-VS-47	arsenic lead	75 24	65 23	14 4
38-VS-46/38-VS-48	arsenic lead	190 36	180 35	5 3
38-VS-74/38-VS-80	arsenic lead	380 46	560 62	38 30
38-VS-96/38-VS-117	arsenic lead	17 5.7	38 16	76 95
SA5-8944/SA5-8940	arsenic lead	11 14	12 17	9 19

### ***Reporting Limits***

To ensure the level of sensitivity meets project goals, reporting limits were reviewed. Reported results are acceptable.

## ***Summary***

The data reviewed are acceptable for use based on a majority of acceptable quality control data. The data generally meet criteria specified in the 1992 Hart Crowser Management Plan. The data may be used to assess analyte concentrations without qualification.

## ***Introduction***

This section presents a quality control (QC) review of data generated from collection and analysis of two soil samples from the Weyerhaeuser-Dupont site in Dupont, Washington, on February 17, 1999. Two primary samples were submitted to MultiChem Analytical Services for analysis. This review includes evaluation of the following:

- Laboratory report and reporting of required analyses
- Chain of custody and holding times
- Method blanks
- Matrix spike / blank spikes (MS / BS)
- Laboratory duplicates
- Field duplicates
- Reporting limits

The data quality review was conducted using guidance from the following documents:

- National Functional Guidelines for Organic Data Review, EPA, February 1994.
- Remedial Investigation/Feasibility Study, Former Dupont Works Site Management Plan, Hart Crowser, January 1992.

Criteria used to assess the data are found in Section 5 of the Management Plan. The analytical data has been compared to the Management Plan limits.

The samples were analyzed for the following chemicals and chemical groups.

Arsenic	EPA 6010
Lead	EPA 6010

## ***Sample Case***

The following sample data group was included in this review:

MAS#: 902024

## ***Laboratory Report and Reporting of Required Analyses***

The laboratory report was complete; all QC results were included. The project scope of work stated that URSGWC would provide industry-accepted evaluation of data quality and documentation of sample acquisition and custody. Comprehensive data validation was not

requested for this round of sampling. The reports provide all necessary information to complete this review.

All analytical methods were reported as requested.

### ***Chain of Custody and Holding Times***

Samples were maintained under chain of custody until arrival at the laboratory. Samples were preserved and cooled. Sample jars were in good condition.

The samples were extracted and analyzed within the 6 month holding time. Holding times were within specifications of the Management Plan.

### ***Method and Field Blanks***

Method blanks were used to determine if samples were contaminated through laboratory procedures or equipment. The laboratory method blanks were free of target analytes. The QC frequency requirement of one laboratory blank per analytical batch was met. No data were qualified due to these results.

### ***Matrix Spikes / Blank Spikes***

Matrix spike analyses were used to assess matrix effects with respect to the analytical data. The QC frequency requirement of one MS and one BS per analytical batch or one MS and one BS per 20 samples, was met.

The spike recoveries ranged from 93 to 99 percent and were within the control limits. No data were qualified due to these results.

### ***Laboratory Duplicates***

The laboratory relative percent difference (RPD) was 17 percent and was within the control limits. No data were qualified.

### ***Field Duplicates***

Field duplicate samples were used to assess sampling precision and representativeness. The QC frequency requirement of one field duplicate for 5 percent of the total samples, specified in the Management Plan, was not met. No data were qualified.

### ***Reporting Limits***

To ensure the level of sensitivity meets project goals, reporting limits were reviewed. All sample results were detections. Reported results are acceptable.

## Summary

The data reviewed are acceptable for use based on a majority of acceptable quality control data. The data generally meet criteria specified in the 1992 Hart Crowser Management Plan. The data may be used to assess analyte concentrations without qualification.

## Introduction

This section presents a quality control (QC) review of data generated from collection and analysis of soil samples from the Weyerhaeuser-Dupont site in Dupont, Washington, in November and December, 1998. Sixty-eight primary samples and three field duplicates were submitted to MultiChem Analytical Services for analysis. This review includes evaluation of the following:

- Laboratory report and reporting of required analyses
- Chain of custody and holding times
- Method blanks
- Matrix spike / blank spikes (MS / BS)
- Laboratory duplicates
- Field duplicates
- Reporting limits

The data quality review was conducted using the following documents:

- National Functional Guidelines for Organic Data Review, EPA, February 1994.
- Remedial Investigation/Feasibility Study, Former Dupont Works Site Management Plan, Hart Crowser, January 1992.

Criteria used to assess the data are found in Section 5 of the Management Plan. The analytical data has been compared to the Management Plan limits.

The samples were analyzed for the following chemicals and chemical groups.

Arsenic EPA 6010/7060

Lead EPA 6010/7421

**Sample Case**

The following sample data groups were included in this data review:

MAS#: 811052

MAS#: 812020

MAS#: 812021

***Laboratory Report and Reporting of Required Analyses***

The laboratory report was complete; all QC results were included. The project scope of work stated that Woodward-Clyde would provide industry-accepted evaluation of data quality and documentation of sample acquisition and custody. Comprehensive data validation was not requested for this round of sampling. The reports provide all necessary information to complete this review.

All analytical methods were reported as requested.

***Chain of Custody and Holding Times***

Samples were maintained under chain of custody until arrival at the laboratory. Samples were preserved and cooled until arrival at the laboratory. Sample bottles were in good condition.

The samples were extracted and analyzed within the 6 month holding time. Holding times were within specifications of the Management Plan.

***Method and Field Blanks***

Method blanks were used to determine if samples were contaminated through laboratory procedures or equipment. The laboratory method blanks were free of target analytes. The QC frequency requirement of one laboratory blank per analytical batch was met.

Three rinse blanks were analyzed. The field rinse blanks were free of target analytes. No data were qualified due to these results.

***Matrix Spikes / Blank Spikes***

Matrix spike analyses were used to assess matrix effects with respect to the analytical data. The QC frequency requirement of one MS and one BS per analytical batch or one MS and one BS per 20 samples, was met.

The matrix spike and blank spike results were compared to evaluate the accuracy of laboratory procedures. The spike recoveries ranged from 67 to 112 percent and were within the control limits with the following exception. Two of the lead MS percent recoveries were not calculated as the sample concentration was greater than four times the spike concentration. No data were qualified due to these results.

### **Laboratory Duplicates**

The relative percent differences (RPDs) ranged from 0 to 26 percent and were within the control limits established by the laboratory. No data were qualified.

### **Field Duplicates**

Field duplicate samples were used to assess sampling precision and representativeness. The QC frequency requirement of one field duplicate for 5 percent of the total samples, specified in the Management Plan, was met. Three sets of field duplicate samples were collected. The RPD of detected compounds were calculated for the duplicate pairs (shown below). The RPDs were acceptable.

Sample ID	Analyte	Primary (mg/kg)	Duplicate (mg/kg)	Relative Percent Difference (percent)
98SCOM0105 / COM0111	arsenic	4.9	4.4	11
	lead	4.6	5.3	14
98SCHR0302 / CHR0311	arsenic	87	82	5.9
	lead	34000	42000	21
98SCHR0407 / CHR0411	arsenic	26	30	14
	lead	190	230	19

### **Reporting Limits**

To ensure the level of sensitivity meets project goals, reporting limits were reviewed. All sample results were detections. Reported results are acceptable.



**Summary**

The data reviewed are acceptable for use based on a majority of acceptable quality control data. The data generally meet criteria specified in the 1992 Management Plan. The data may be used to assess analyte concentrations in the groundwater without qualification.

**Introduction**

This section presents a quality control (QC) review of data generated from collection and analysis of groundwater samples from the former DuPont Works site in Dupont, Washington, on October 17, 1997. Eight primary samples and one QC sample (field duplicate) were submitted to MultiChem Analytical Services for analysis. This review includes evaluation of the following:

- Chain of custody and holding times
- Laboratory report and reporting of required analyses
- Laboratory blanks
- Rinsate (field) blanks
- Field duplicates
- Laboratory duplicates
- Matrix spike/matrix spike duplicates (MS/MSD)
- Surrogate recoveries (where applicable)
- Reporting limits

The data quality review was conducted using the following documents:

- National Functional Guidelines for Organic Data Review, EPA, February 1994.
- Remedial Investigation/Feasibility Study, Former DuPont Works Site Management Plan, Hart Crowser, January 1992.

Criteria used to assess the data are found in Section 5 of the Management Plan. The analytical data has been compared to the Management Plan limits.

The samples were analyzed for the following chemicals and chemical groups.

**Explosives (NAX):** SW846 8090 (modified)

**Sample Case**

The following samples were included in this data review:

MW-22	MW-6
MW-22-D (Blind field duplicate of MW-22)	MW-8
Seep-1	W-2
MW-3	W-1
MW-19	

**Chain of Custody and Holding Times**

Samples were maintained under chain of custody until arrival at the laboratory. Samples were preserved and cooled.

The sample holding times were within specifications of the Management Plan.

**Laboratory Report and Reporting of Required Analyses**

The laboratory report was complete and all QC results were included. The project scope of work stated that Woodward-Clyde would provide industry-accepted evaluation of data quality and documentation of sample acquisition and custody.

Section 5.0 of the Management Plan gives the required QC level of effort, including QC measures such as calibration frequency. Some of these QC measures may have been met by the laboratory, but were not confirmed through data evaluation because comprehensive data validation was not requested. The reports provide all necessary information to complete this data assurance review.

All analytical methods were reported as requested.

**Method Blanks**

Method blanks were used to determine if samples were contaminated through laboratory procedures or equipment. The laboratory method blanks were free of contamination. The QC frequency requirement specified in the Management Plan of one laboratory blank per analytical batch was met.

**Rinsate (Field) Blanks**

No rinsate blanks were associated with the samples because samples were transferred directly from dedicated bailers into sample jars.

**Field Duplicates**

Field duplicate samples were used to assess sampling precision and representativeness. The QC frequency requirement of one field duplicate for 5 percent of the total samples, specified in the Management Plan, was met. One set of field duplicate samples was collected at MW-22 and the duplicate was identified as MW-22-D. Only two compounds were detected; all other compounds were non-detect. The relative percent difference (RPD) of detected compounds were calculated for the duplicate pair (shown below). All RPDs were acceptable.

ANALYTE	PRIMARY (µg/L)	DUPLICATE (µg/L)	RELATIVE PERCENT DIFFERENCE (percent)
2,6-dinitrotoluene	0.14	0.14	0%
2,4-dinitrotoluene	0.029	0.027	7%

**Laboratory Duplicates**

The laboratory analyzed matrix spike/matrix spike duplicates for the explosives method.

**Matrix Spike/Matrix Spike Duplicates**

Matrix spike analyses were used to assess matrix effects with respect to the analytical data. The QC frequency requirement specified in the Management Plan of one MS and one MSD per analytical batch was met.

The matrix spike and matrix spike duplicate results were compared to identify the laboratory precision. The MS/MSD RPDs were all within the control limits established by the laboratory and found in the Management Plan. No data were qualified.

All blank spike/blank spike duplicate (BS/BSD) recoveries were within the control limits. No data were qualified.

**Surrogate Recoveries**

Surrogate compounds were used in the analysis of organic compounds (EPA Method 8090 modified) to monitor analyte extraction efficiency/method accuracy on a per sample basis. All surrogate recoveries were within the Management Plan control limits. No data were qualified due to surrogate results.

**Reporting Limits**

To ensure that the level of sensitivity required for project goals was met, reporting limits were reviewed. The reporting limits requested in the Management Plan were met or exceeded.

<b>ANALYTE</b>	<b>REQUESTED RL (µg/L)</b>	<b>ACTUAL RL (µg/L)</b>
nitrobenzene	1.7	0.40
1,3-dinitrobenzene	0.44	0.040
2,6-dinitrotoluene	0.13	0.010
2,4-dinitrotoluene	0.13	0.020
1,3,5-trinitrobenzene	0.16	0.040
2,4,6-trinitrotoluene	2.9	0.040